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BETTER FRUIT

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U. S. Department of Agriculture

Special Features

Editorials—How the Fruit
Grower Can Do His “Bit” for
Our Country



To Can Food with Ordinary
Home Utensils



Preparedness for Winter’s
Food Supply

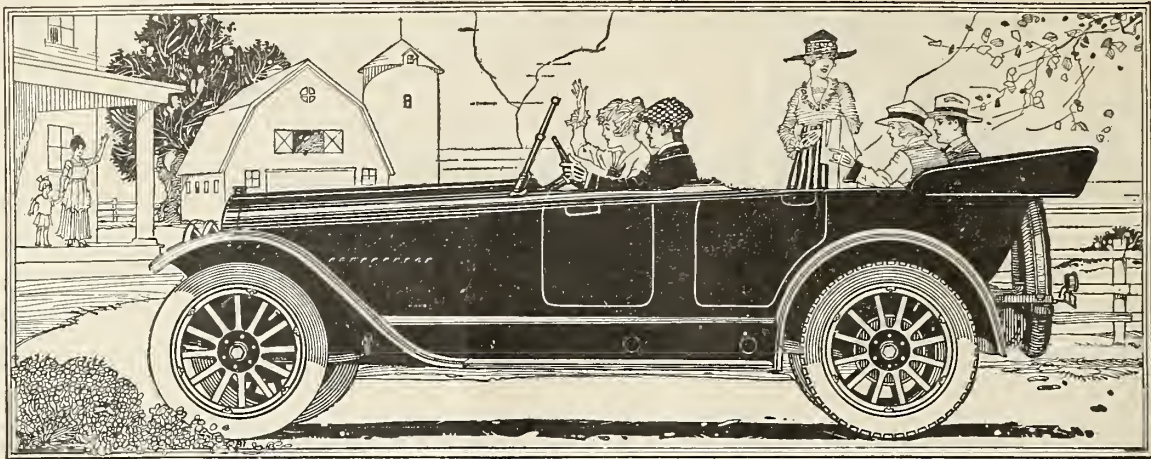


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BETTER FRUIT PUBLISHING COMPANY, PUBLISHERS, HOOD RIVER, OREGON

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The world's food reserves are low. . . . Upon the farmers of this country, therefore, in large measure rests the fate of the war and the fate of the nations. MAY THE NATION NOT COUNT UPON THEM TO OMIT NO STEP THAT WILL INCREASE THE PRODUCTION OF THEIR LAND, etc.

To the American Farmer

You heard the "call" from the head of your nation addressed directly to you. What have you done about it? The "call" for maximum food production means greater acreages to be prepared, planted and cultivated. Are you equipped to answer your country's demand? You have done it in the past—you, no doubt, will do it NOW.

But conditions are different. Then, it was a "call to arms." Now it is a "call to farms"—to grow more food because there is a vast shortage in the world's food reserves. This means YOU must plow more; plant more; do it quicker; do it better; in order to do your full duty to your country's demand. You must plant every available acre, especially should your acreage of grain be extended. Your problem will be easier; your response to the "call" more helpful, if you will "enlist" the services of a

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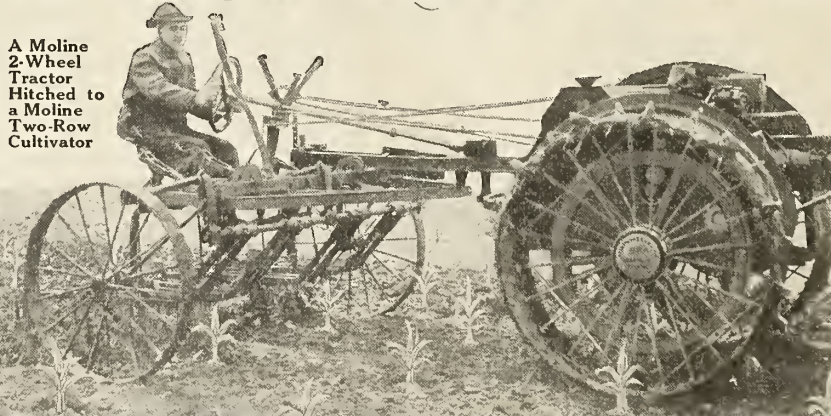
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BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

One-Period Cold-Pack Canning with Home Utensils

[Office of Information, U. S. Department of Agriculture]

Can Surplus Food But Use Jars and Cans Wisely

Don't have an empty preserving jar in your home next fall.

There may be some difficulty in securing cans and preserving jars.

Reserve regular tight-sealing containers for vegetables, concentrated soups, meats, and fish.

Concentrate products so that each jar or can will hold as much food and as little water as possible.

Put up jams, jellies and preserves in glasses sealed with cork or paper and paraffine. Pack fruit juices in ordinary bottles.

Don't can anything that can be kept just as well dried or in other forms. Dry navy and mature lima beans for winter use.

Produce in your garden lots of cabbage, potatoes and root crops that can be kept for the winter without canning.—U. S. Department of Agriculture.

Don't let valuable surplus fruits and vegetables go to waste. Adults and children in a very few hours, with little other home equipment than a wash boiler and cans and jars, can preserve much valuable perishable food for next winter's use. Succulent vegetables and fruits are important to health the year round. See that your table is supplied. The simple one-period cold-pack method described is that taught by the U. S. Department of Agriculture for the boys and girls of the canning clubs in the Northern and Western States. With this method thousands of boys and girls each season put up vast quantities of fruits and vegetables. With this method practically every vegetable and fruit grown in this section can be canned. The wash-boiler method described below is entirely effective. Those who desire may purchase home-size water seal, steam pressure or pressure cooker canning outfits which save time and fuel.

Preliminary Preparation for Canning

Provide a false bottom of wooden lattice work, cross pieces of wood, or coarse wire netting for your clean wash boiler or other large, deep vessel to be used for sterilizing. Fill the vessel with clean water so that the boiling water will cover the tops of the jars or cans. Begin heating the water so that it will be boiling violently by the time the containers are packed. See that all cans or jars are in good condition and absolutely clean. Scald them thoroughly. Use new rubber rings and scald them just before putting them on the jars.

Preparing Fruits and Vegetables

Start with clean hands, clean utensils, and clean, sound, fresh products. Throw out all vegetables and fruits which are withered or unsound. Wash

out all grit and dirt. If possible, use only fruits and vegetables picked the same day and never can peas and corn picked more than five hours. Prepare fruits and large-sized vegetables for blanching. Remove all spots from apples. Prepare beans and greens as for cooking. Be especially careful to remove all foreign plants from the greens. Blanch vegetables and all fruits except berries by leaving them from three to five minutes in clean boiling water. Remove the blanched products from the boiling water and plunge them quickly into cold water, the colder the better. Take them out immediately and let them drain. Don't let them soak in the cold water.

From this point on, speed is highly important. The blanched vegetables and fruits, which are slightly warm, must not be allowed to remain out of the jars a moment longer than is necessary. Remove skins when required, and as each article is pared cut it up into proper size and pack directly into the clean, scalded cans or jars. Pack as solid as possible, being careful not to bruise or mash soft products. In the case of fruit, fill the containers at once with boiling-hot syrup. In the case of vegetables, fill the containers with boiling-hot water to which a little salt has been added. Place scalded rubber rings on the glass jars and screw down the tops. Seal tin cans completely. Watch them for leaks. As the pre-

TIME TABLE FOR SCALDING, BLANCHING AND STERILIZING OF FRUITS AND VEGETABLES BY ONE-PERIOD COLD-PACK METHOD—SEE N. R. SERIES

	Scald or Blanch Minutes	Hot Water Bath Outfits at 212° Minutes	Water Seal Outfits at 214° Minutes	Steam Pressure 5 to 10 Lbs. Minutes	Pressure Cooker 10 to 15 Lbs. Minutes
<i>Fruits of all kinds—</i>					
Apriots	1 to 2	16	12	10	5
Blackberries	no	16	12	10	5
Blueberries	no	16	12	10	5
Cherries (sweet)	no	16	12	10	5
Dewberries	no	16	12	10	5
Grapes	no	16	12	10	5
Peaches	1 to 2	16	12	10	5
Plums	no	16	12	10	5
Raspberries	no	16	12	10	5
Strawberries	no	16	12	10	5
Citrus fruits	1½	12	8	6	4
Cherries (sour)	no	16	12	10	5
Cranberries	no	16	12	10	5
Currants	no	16	12	10	5
Gooseberries	no	16	12	10	5
Rhubarb (blanch before paring)....	1 to 2	16	12	10	5
Apples	1½	20	12	8	6
Pears	1½	20	12	8	6
Figs	15	40	30	25	20
Pineapple	10	30	25	25	18
Quince	6	40	30	25	20
<i>Special Vegetables and Combinations—</i>					
Tomatoes	1 to 3	22	18	15	10
Tomatoes and corn	T. 2, C. 10	90	75	60	45
Eggplant	3	60	45	45	30
Corn on cob or cut off	5	180	90	60	45
Pumpkin	5	90	50	40	35
Squash	5	90	50	40	35
Hominy	5	120	90	60	40
Cabbage or sauerkraut	5	90	75	60	35
<i>Greens or Pot Herbs—</i>					
Asparagus	5	120	90	50	35
Brussels sprouts	5	120	90	50	35
Cauliflower	5	120	90	50	35
Pepper cress	15	120	90	50	35
Lamb's-quarters	15	120	90	50	35
Sour dock	15	120	90	50	35
Smartweed sprouts	15	120	90	50	35
Purslane or "pusley"	15	120	90	50	35
Pokeweed	15	120	90	50	35
Dandelion	15	120	90	50	35
Marsh marigold	15	120	90	50	35
Wild mustard	15	120	90	50	35
Milkweed (tender sprouts and young leaves)	15	120	90	50	35
<i>Pod Vegetables—</i>					
Beans (lima or string)	5	120	90	60	40
Okra	5	120	90	60	40
Peas	5	120	90	60	40
<i>Roots and Tubers—</i>					
Beets	6	90	75	60	35
Carrots	6	90	75	60	35
Sweet potatoes	6	90	75	60	35
Other roots and tubers as parsnips or turnips	6	90	75	60	35
Soups, all kinds	90	75	60	45
Shell fish	3	180	120	90	60
Poultry and game	20	210	180	150	60
Fish	5	180	180	150	90
Pork and beef	30	240	240	210	90

Time schedule given is based upon the one-quart pack and upon fresh-picked products.

liminary treatment has taken care of expansion it is not necessary to exhaust the cans.

How to Sterilize or Process

Put the jars or cans as soon as possible into boiling water in a wash boiler or into your canning device. Let them process for the time specified in the table, counting from the time the water begins to boil again, or the gauge on the canning outfit registers the proper pressure.

When processing fruits in steam pressure canners, not over five pounds of steam pressure should be used. When

processing vegetables and meats do not use over fifteen pounds pressure. After processing, remove the containers. Tighten the tops of jars immediately and stand the containers upside down in a cool place, being careful that no draft strikes the hot jars. Watch for leakage and screw covers down tighter when necessary. Store in a cool, dry place, not exposed to freezing temperature. Use band labels for cans, being careful not to let the glue get on the can itself, as it may cause rust.

From time to time, especially in very hot weather, examine jars and cans, making certain that there are no leaks,

swellings or other signs of fermentation. There will be no spoilage if the directions are followed implicitly and the containers are sealed up tight. Fruits which are put up with heavy syrups can be kept under cork and paraffine seal. Save all wide-necked bottles, glasses and jars for putting up fruit. Vegetables, meats and fish, however, cannot be kept safely unless they are hermetically sealed. Reserve regular jars for products that cannot be packed in other ways. As there may be some difficulty in securing cans and jars, dry or keep in other ways everything that need not be canned.

Manufacture of Fruit Products in Oregon

By Robert G. Paulus, Manager Salem Fruit Union, Salem, Oregon

THE subject "By-Products," so-called, is one that has been receiving a great deal of attention in the Northwest of late on account of coming over-productions of various fruits, and also on account of the fact that with the enormous increase in fruit production a much larger percentage of lower grade fruit finds itself without an outlet in the shipping market, making it necessary to find local methods of disposing of these lower grades to keep them from spoiling. This is particularly true of apples. The grower picks his crop, sorts, grades and packs it, and after taking out his better merchantable apples he finds himself in possession of a quantity of fruit sometimes large, sometimes small, depending on the season and other conditions, on which he has already incurred all the expense of growing and harvesting, and on which it behooves him to try to realize this cost.

The term "By-Products" with relation to the fruit industry is a term very much misused and very much out of place, especially in the way it concerns almost every other fruit grown in the Northwest, except apples and pears. We of the Willamette Valley object very strenuously to this name and figure that the coupling of the name "By-Products" to the canning and packing of fresh and dried fruits is likely to do a great deal of injury to this branch of the fruit business. We maintain that the proper term to use in this connection is "Fruit-Products." The term "By-Products" when associated with the manufactures of the East is usually connected with the refuse left over from the operation of manufacturing a product, such as the case of the hoofs, horns, etc., of the meat-packing houses, the products made from the left-overs of the oil business, etc. Applied to the fruit business it should relate to the utilization of the peelings and cores of an apple-drying plant, or an apple-canning factory, to the stems of the cherries from fruit canneries and the stems and seeds of cherries from an evaporator; the stones of peaches and apricots in canning and evaporating. In the loganberry-juice business it would pertain to the seeds and pulp which is left after squeezing out the juice, and we might carry this on fur-

ther into the manufacture of all fruit products. To some it may seem queer to speak of the utilization of cherry seeds and stem, but this is actually done; these by-products being carefully dried and shipped to Europe, where they are used for making prussic acid, flavoring extracts, etc. In California large quantities of peach and apricot kernels are exported to Europe for this purpose. Peelings and cores of apples are also evaporated and the pectin extracted and used by Eastern jelly manufacturers as a base for a number of jellies.

In the loganberry-juice business pectin may be extracted from the pulp and the seeds furnish a very fine oil which will saponify beautifully, and while they are not as yet being utilized, it is only a question of time until a very fine soap, a perfume base and many other things will likely be made from these seeds, which are apparently worthless.

To get back to the fruit-product business in its true sense, we defend the use of the above term in the fact that in all of the fruit-packing plants in the Northwest, speaking particularly of canneries, evaporators, dried fruit-packing plants, loganberry-juice plants, and plants conducted for the manufacture of unfermented apple juice, only sound fruit, and usually the best fruit we have, is used. Our canneries use only first-class fruits. Our evaporators cannot afford to use fruits unfit to make a product which will not compete with Eastern or foreign goods. Our loganberry-juice factories demand and can use only first-class sound fruit.

From this standpoint you can readily see our position in regard to the attitude we have taken in calling the output of canneries, evaporators, dried-fruit-packing plants, juice factories, etc. "Fruit-Products" and not "By-Products," and we believe there should be a concerted action on the part of the fruit interests of the Northwest and the agricultural colleges of these states to gradually eradicate this term from our fruit vocabularies. There is one exception to the above, and that is vinegar, for vinegar, while it is in its fullest sense a fruit product, is sometimes in the class of a by-product. In the old days I have seen apples go into vinegar which even

a half-starved hog would sniff at, and which were wholly unfit for the purpose, and which would not make a product fit for human consumption, but times have changed and more care is being taken even in the manufacture of vinegar. In our dried-fruit department I have instructed our growers not to evaporate anything which in their judgment is unfit in the fresh state for human food; in fact, they have been instructed not to evaporate anything they would not eat themselves. The fruitgrowers of the Willamette Valley have taken a great deal of interest in this matter the past four or five years, and the improvement in the pack of evaporated fruits of the Northwest has been remarkable.

I will now give you a few details of the fruit-products business. Taking up the evaporated prune business first, we will begin with the prunes in the orchard. Picking of prunes usually commences about the first to the fifteenth of September. The prunes are allowed to ripen on the trees and fall off on the ground. In some seasons when the weather is cool and moist the prunes do not have a tendency to fall easily and it is necessary to assist nature by shaking the trees. The prunes are then picked from the ground by pickers and put into boxes. Most growers use a box holding half bushel and one which is built with slatted sides to allow for ventilation. The fruit is then hauled to the evaporator, which is usually owned by the grower himself. It is next put through an operation known as "dipping," in which the fresh prunes are cleansed of the dirt which they have accumulated while on the ground. They are then placed on screen wire trays and placed into the dryer to dry. There are several types of dryers in use in the Willamette Valley, those being most used being known as the tunnel and stack type. In the tunnel dryers the tray of fresh fruit is placed on runways which have a slope toward the back end of the dryer, which is the heat intake end. It has been found advisable not to have too much pitch in the slope on account of the fact that the angle created causes the fruit to roll to the lower side of the tray, sometimes piling the prunes on top of each other, or causing spilling of

the fruit when the trays are moved. The prunes remain in these tunnels from 24 to 36 hours. As fast as the prunes are sufficiently dried they are taken out of the other end of the evaporator and more prunes put in at the front end to take their places. They are immediately sacked in 100-pound manila sacks and as soon as possible taken to the association packing house. Here the grower is given a receipt for the net weight of his prunes and they are run over a grader which sorts out the prunes according to size, and as the large prunes are worth more than the small ones each grower is given credit for his fruit as it actually grades when final settlement is made. From the grader the prunes are then put in bins for each size, where they remain until they are packed. The prunes are next put through the operation known as "processing" before being packed, and they go into the boxes hot. Where prunes are sold unfaced they are practically never touched by human hands after being put into the processor, until they are opened in the East by the retailer. Where prunes are sold faced it is necessary for two layers of prunes to be put into the bottom of the boxes, flattened and placed in regular rows, after which more prunes are packed on top of this facing and after the bottom is nailed on the box is turned over, and when opened is opened on the faced side, making a beautifully arranged display of faced prunes. About half to two-thirds of the prunes this year were sold faced. This part of the operations of the Salem Fruit Union's plant alone necessitated the employment this fall of from one hundred to one hundred and twenty-five women for a period of about two months. The total pack through their Salem warehouse this year will amount to about two and one-half million pounds, in addition to which they handled about one and one-quarter million pounds in other parts of the Willamette Valley.

Going back to the processing operation, this is done by putting the prunes through a long box or barrel-shaped machine, and turning live dry steam on them. In this machine there are boiling-water sprays, which clean the prunes so well that it is impossible to get your hands soiled in handling them when they come out of the processor. This operation requires a great deal of care in order not to get too much moisture into the prunes; otherwise they will not keep. The main idea is to get enough heat into the prune to thoroughly sterilize it, and just as little moisture into the fruit as is possible to do so. The gain in weight, due to processing, the past two years has been only about one and three-quarters to two per cent. The prunes are packed in 10, 25 and 50-pound wooden boxes, lined with nice, clean, white waterproof paper. 40,000 pounds gross weight has been the minimum car up to this season, but the minimum has been raised to 60,000 pounds gross weight this year.

Taking up the loganberry-juice business next, we will start with the berry in the loganberry yard, or vineyard

as it is sometimes called. The berries are allowed to get full ripe before picking, and as they are very perishable they are not allowed to stand long, but are rushed to the juice factory as soon as possible. The season for picking commences about the 20th of June to the 1st of July. They are picked in berry hallocks holding approximately one pound each, twenty-four hallocks to a crate, which is built single decked in order that by putting a screen over the tops of the crate the entire crate of berries may be dumped at one operation, saving handling of each hallock separately. The berries are then crushed and run into the press cloths and pressed. The juice is sterilized and put into storage. Later, as fast as sold, it is bottled, labeled, cased and shipped out to the trade. The manufacture of loganberry juice is a very delicate operation, and requires extreme care and cleanliness.

The canning of fruits is a business which requires a great deal of experience, and the details of this business are so intricate that a short delay or small oversight can do a great deal of damage. Fruit is usually put up in what is known as No. 2, No. 2½, No. 3 and No. 10 cans, and the grade is known as Special Extra, Extra, Extra Standard, Standard, Seconds, Water and Pie grades, according to the degree of syrup and quality of fruit put in the cans. After the preliminary operation of stemming, peeling, coring or other operation which it may be necessary for the fruit to go through, the fruit is washed thoroughly and the proper quantity of fruit for the size can to be canned is weighed into the can. The cans are then placed on an endless chain which carries them to the syruper, where the proper degree of syrup is turned on and the cans are filled. From here the fruit is automatically carried to the exhaustor, where live dry steam is turned on. There the fruit is thoroughly heated and the surplus air is driven out of the can, from which machine the fruit is carried to the capping machine, where the lid is crimped onto the can and sealed airtight. From this machine they are carried through the cooker, and the fruit is cooked the proper length of time in the sealed can. From the cooker it is automatically carried to the cooling tanks, where, after a short immersion, it is taken out to the cooling room and stacked, where it is left until it is to be cased up, at which time it is looked over carefully, and what are known as the "swells" are taken out. A swell is a can of fruit which, through imperfect sealing or improper cooking, was not sufficiently sterilized to keep, and when fermentation begins gases will form which press the lids of the can out, giving it a swelled appearance; hence the name "swells." As soon as the goods are tested for swells and cased they are ready for shipment. 40,000 pounds constitutes a minimum car. It is not generally known to the public, but is recognized by the canners, that the fruit produced in the Willamette Valley, Oregon, is of a very superior quality for this purpose. This

is not alone due to the fact that, on account of the particularly favorable climate, small fruits and berries grow to perfection in the Willamette Valley, but also on account of the greater intensity of the flavors in fruits grown there. From the fruit-products standpoint the Willamette Valley has a very bright outlook for the future.

Taking up the making of cider vinegar, the apples are ground and crushed and the juice pressed from them, the juice then being run into storage tanks for what is known as the alcoholic fermentation. After this is complete, which requires from 60 to 90 days, according to the temperature, the generating process is taken up. This consists of running the fermented cider through the generators or generating tanks, which are usually five feet in diameter and fourteen feet high, and are constructed with a false top and a false bottom filled with holes, through which the vinegar seeps. The spaces between these false bottoms and tops are filled with curled beat shavings, over which the vinegar runs, the purpose of these shavings and the false bottom being to expose the vinegar stock to the oxygen in the air, in which process the alcohol in the cider is converted into natural acetic acid. In Oregon the state law requires a four per cent acetic acid test. This is something known as 40-grain vinegar. In Washington the law requires a four and one-half per cent standard, or a 45-grain vinegar. Vinegar is sold on the percentage of acetic acid test, which is denoted as 40-grain for four per cent acetic acid, 45 grain for four and one-half per cent acetic acid, 50 grain for five per cent acid. After the vinegar has been put through the proper processes it is either bottled or put into barrels, according to the requirements of the trade, and shipped to the wholesale houses, who in turn ship it to the retailers as fast as required. The idea of a good vinegar maker is to produce vinegar that is a beautiful transparent yellow color, which will not precipitate a heavy sediment or cloud up in the bottle.

By way of summary, there are eighteen dried-fruit-packing plants in Oregon and Clarke County, Washington, and they handled the past year about 40,000,000 pounds of evaporated prunes, 750,000 pounds evaporated loganberries and a considerable quantity of other evaporated fruits and vegetables. I would judge that there is invested in these plants and their equipment \$275,000, and the total cash brought into the State of Oregon and Clarke County, Washington, by them this year amounted to approximately \$3,250,000. There are sixteen canneries operating in Oregon and Clarke County, Washington, and their total pack was 525,000 cases, valued at approximately \$1,250,000. Total capital invested in canning plants and equipment is a little out of my line, but I presume would not be less than \$300,000. I have included Clarke County, Washington, as it bounds Oregon on the north and is isolated from the rest of the State of Washington and a great proportion of

Continued on page 17



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To Preserve Strawberries

[Office of Information, U. S. Department of Agriculture]

SPECIALISTS in commercial handling and preserving of fruits in the Bureau of Chemistry, U. S. Department of Agriculture, have worked out the following accurate directions (which may be applied also to household conditions) for preserving strawberries so that just enough syrup of the proper consistency can be made in advance. With this amount of syrup the berries can be packed attractively without floating and no syrup will be left over, which in many cases means an important saving in sugar.

While the berries and syrup are cooking, place the empty clean jars and caps in tepid water and bring to a boil, and allow to boil for at least 15 minutes. Remove the jars from the water only as they are to be filled and the caps only when they are to be placed on the jars. Simply drain jars and caps; do not wipe them. One of the inexpensive jar lifters will be convenient in handling the hot jars. Do not boil rubber rings for any length of time. Just before placing them on the jars dip the rings for a moment into a quart of boiling water into which one teaspoonful of bicarbonate of soda has been added.

Strawberry Preserves. Recipe No. 1— Add 35 ounces of sugar to half pint of water, bring to a boil and skim. To this amount of syrup add exactly 2½ pounds of washed, capped and stemmed strawberries. Boil the fruit until it

registers 222 degrees Fahrenheit on a candy or chemical thermometer. If no thermometer is available, boil until the syrup is very heavy—about as thick as molasses. Remove scum from the preserves. Fill the sterilized jars full of hot berries. Pour in enough of the hot syrup to fill the jar, leaving as little air space as possible. Put sterilized rings and caps on at once, but do not fasten tightly. Stand the sealed jars in tepid water up to their necks if possible. Bring this water to a boil. Let pint jars stay in the boiling water for at least 15 minutes and quart jars at least 25 minutes, then close caps tightly at once. At the conclusion of the operation, stand each jar for a moment on its cap to make sure that the seal is absolutely tight.

Strawberry Preserves. Recipe No. 2— The following method is preferred by some because it leaves more of the natural color in the preserves. To two pounds of washed, capped and stemmed strawberries add 26 ounces sugar, let stand over night. In the morning pour juice thus obtained into a preserving kettle, add berries and cook to 222 degrees Fahrenheit, or until the syrup is very heavy. Pack and sterilize as in recipe No. 1.

Importance of Thermometer in Preserving—The preserving specialists advise those who are going to put up any quantity of preserves to purchase a chemical thermometer which gives

readings by degrees Fahrenheit for each degree from 212 degrees up. Equipped with such a thermometer, the preserver can be certain of uniform results. The syrup will not reach 222 degrees Fahrenheit until it is cooked enough and is of the best preserving consistency. The reason for this is that the syrup will not reach this temperature until the proper amount of water has been driven off by boiling. Such a thermometer is also very useful in all forms of preserving, in candy making, and in other cooking operations where results depend upon exact heating.

The following tested recipe for preserved strawberries is used in the boys' and girls' club work in the Northern and Western States: Make a syrup of 1 quart of water and 11 pounds of sugar and cook in an open kettle until a candy thermometer registers 265 degrees when placed in the syrup. Add eight pounds of berries to the syrup. Cook very slowly, just at the boiling point. Stop the cooking when the thermometer registers 219 degrees and pour into shallow pans to cool. Hasten cooling by pouring syrup over berries. Skim while cooling. Fill into jars when cold and allow to stand unsealed for four days. Put rubber and cap in position, not tight. (Cap and tip, if using enameled tin cans.) If using a hot-water bath outfit, sterilize 20 minutes; if using a water-seal outfit, or a five-pound steam pressure outfit, or a pressure-cooker outfit, sterilize 15 minutes. Remove jars. Tighten covers. Invert to cool and test the joint. Wrap jars with paper to prevent bleaching and store.

Added Honey Production Will Materially Relieve Sugar Shortage

Every beekeeper has an opportunity to "do his bit" by increasing his number of hives and seeing to it that every colony is in first-class condition. The unfavorable season has, in many instances, caused a depletion of stores to such an extent that brood rearing has practically ceased in the colony, and in such cases it may be advisable to do a little stimulative feeding to get brood rearing started at once. It will be possible, through the Oregon Beekeepers' Association, and also through the Oregon Agricultural College, says Professor Lovell, Entomologist at O. A. C., to get assistance in marketing the crop through the U. S. Department of Markets. The possibility of an overproduction is groundless and there is a real need for every extra pound of honey that can possibly be produced. Beekeepers are urged to write to Oregon Agricultural College, Corvallis, for advice in regard to beekeeping and to advise the college that they are working toward a heavy production this year.

"You farmers buy a good many gold bricks, eh?" "Yes, and you city fellers buy a good deal of swamp land. I guess things are about even." — Louisville Courier-Journal.

PROOF that Blasting the soil pays fruit growers

EVIDENCE

"In preparing the ground for the planting of trees the *Rural Press* recommends the use of powder." **PACIFIC RURAL PRESS, San Francisco.**

"We advocate the use of explosives for loosening up compact soils and hardpan in tree planting, knowing the value of such work." **FANCHER CREEK NURSERIES, Fresno, Cal.**

"The use of a good explosive is of great benefit in planting an orchard, as the ground should be loose enough to allow roots to go to their natural depth easily." **BENEDICT NURSERY CO., Portland, Ore.**

"We favor blasting holes for trees where the soil is heavy. Powder will loosen the soil, giving it a better chance to become aerated, as well as making it more retentive of moisture." **OREGON NURSERY CO., Orono, Ore.**

"My orchard has made excellent growth, due to the fact that I used dynamite, breaking up the soil and making excellent beds for the roots. If I were to set another orchard I would not think of doing so without blasting each tree hole." **T. A. JOHNSON, Boise, Idaho.**

"We have used explosives in digging tree holes in the hard caliche subsurface layers which occur here. We find this cheaper than the use of pick and crowbar, and more satisfactory in that the soil is shattered deeper than the hole could be dug." **GEORGE T. FREEMAN, Arizona Agricultural Experiment Station, Tucson.**

"The use of Farm Powders in the orchard industry is rapidly being learned and appreciated. The worst looking orchard I ever saw, suffering from a lack of drainage, was blasted two or three years ago, and now it looks as fine as any other well kept orchard in this valley." **E. H. SHEPARD, Publisher "Better Fruit," Hood River, Ore.**

"We have observed many cases in which powder has been used for blasting beds for fruit trees, invariably with great success. The use of explosives is of material benefit when the soil is inclined to be rather shallow and underlain with a hard subsoil. There are few soils in which blasting cannot be done profitably." **THE FRUIT GROWER, St. Joseph, Mo.**

"I have done a great deal of orchard planting and use powder for making the holes. At first it was used chiefly on heavy hardpan or other soils that were difficult to prepare with the spade, but is now used on all classes of soil. If I were planting trees even in light soil, easily handled, I should prepare all the holes with powder. Trees so planted make extraordinary growth." **FRANK FEMMONS, Oakhurst, Cal.**

"Generally speaking the growth of plants depends upon the condition of the soil into which the roots penetrate. If the depth of loose soil is too limited or the surface water is permitted to stand too long the growth is impaired. Explosives properly used in such instances have invariably relieved the condition and resulted in excellent growth. The yield is often three times as great on blasted soil as from those untreated in the same vicinity." **ROSECROFT NURSERY & FRUIT FARM, Sumner, Wash.**

"The O'Connor prune orchard near Los Gatos in the Santa Clara Valley, California, was blasted in 1913. During the previous six years the largest crop was 3,900 pounds. In 1914 after the blasting, the crop was 8,000 pounds, more than double. It was a dry year, too. Where there were from 30 to 40 per cent. of 'drops' in the orchards on both sides, the O'Connor place lost only about 5 per cent. Prunes from the blasted orchard averaged much larger and the trees made a better growth and retained their foliage a month longer than the orchards on either side." **JOHN A. GALPIN, Los Angeles, Cal.**

"My orchard was planted three years ago and all trees were of even age and size. I intended to blast the whole orchard but ran out of powder and finished the small balance without it. This enabled me to compare the growth of the trees and satisfy myself that the expense was justified. The trees that were planted in blasted ground show a growth of 75 to 100 per cent. over the trees that were planted in ground not blasted. They also appear healthier and more satisfactory in every way. I have just bought 1100 more prune trees and would not think of planting them without preparing the ground with powder." **HERMAN H. SMIDT, R. 3, Oregon City, Ore.**

is given by many fruit growers in the accompanying page from the Giant book, "Better Orchard Tillage." These men say that blasting

- enables the trees to root deeper;
- adds moisture storage capacity;
- saves labor and money;
- improves orchards that are not doing their best;
- is always profitable when properly done;
- places the soil in the ideal condition that permits newly planted trees to make extraordinary growth;
- increases the yield of fruit.

Scores of the most successful fruit growers in the Pacific Coast States plant all of their trees in beds blasted with one of the

GIANT FARM POWDERS
STUMPING — AGRICULTURAL

—Eureka Stumping Powder or Giant Stumping—both of which are made especially for this and other agricultural work. They have found these Giant Powders particularly well adapted to subsoiling and for blasting tree beds.

Some kinds and grades of explosives tend to shatter and pulverize anything they come in contact with. They act too quickly. These ordinary dynamites do not do the work well and cost more. Eureka Stumping Powder exerts its strength slowly, comparatively speaking. It tends to disrupt, crack, split and heave the soil and it extends its influence over a wide area. It loosens and pulverizes the soil instead of packing it and throwing it high in the air. This is the action that is wanted in soil work and this action the "high percentage" dynamites will not give.

Warning Giant Powder is the trade name of explosives manufactured by the Giant Powder Co., Con. Because Giant Powders are best known everywhere, many have assumed that all high explosives are Giant Powders. Insist upon having the genuine, made only by The Giant Powder Co., Con. If your dealer has only ordinary dynamites, write us and we will see that you are supplied with real Giant Powders.

Try ONE BOX

Perhaps you have never planted trees in blasted beds. To make it easy for you to prove the value of blasting the soil, we print a trial order form in the coupon to the right. Fill it out and we will have our nearest distributor supply you—at the lowest market price—with a 25- or 50-lb. case of either of the Giant Farm Powders. Blast beds for all of your trees. Plant one in a spade-dug hole, the ordinary way. Note the difference in growth.

If you are using explosives for tree-planting, test a case of Giant alongside of the brand you have been using. After blasting with each, take a spade and see how much more thoroughly Giant does the work.

Remember that you can blast whenever the soil is dry, from a day to a year before planting time. Many growers keep Giant Farm Powders always on hand.

Have You Had the Book "Better Orchard Tillage"?

Prepared especially to tell the facts about blasting soils for orchards and in orchards of the West. It tells how to secure the proper sub-irrigation conditions by blasting. It explains how blasting promotes drainage and increases both moisture-storage capacity and fertility. It gives detailed directions for preparing the soil for tree planting or for deep cultivation of established trees. We will send a copy free on request. Tell us about your problems and mark and mail the coupon. Other books on Ditch Blasting, Boulder Blasting, Subsoil Blasting for all farm crops, and Stump Blasting will also be sent on request. Ask for the books that interest you.

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Preparedness for Winter Food Supply Bulletin

By Dr. Ernest W. D. Laufer, Agronomist American Steel and Wire Company

GREAT and momentous times are for the first time since the Civil War again confronting the nation. The resources and savings of years of peace are again being pledged to the prosecution of war, more gigantic and more relentless than any war that has been fought in the history of mankind. Not all of us are chosen, however, to fight this great war with gun and saber, or by blood purchase, some must stay behind to pledge all that they possess in the effort to produce enough food to keep the valiant soldiers fed and their babes and wives at home from starvation. Our beautiful land of unlimited resources must be made to show its prowess in agricultural production, so

that none within her boundaries shall feel the pangs of hunger and the degrading influence of poverty.

Citizens and countrymen, it is your solemn duty to produce and conserve all of the food that it is possible to produce and conserve. No matter how small the garden or how tiny the number of pounds saved from waste, concerted effort will produce a potential weapon against our most dangerous enemies, hunger and food riots. In choosing what things to grow in the garden, it should be borne in mind that the crops to be consumed at once, such as lettuce, radishes, melons, etc., are to occupy the most limited space, while crops that can be dried, cooked, steam

processed, or cellared should be grown as abundantly as possible. The vegetables that are most readily preserved by cooking or steam processing are peas, sweet corn, tomatoes, spinach, Swiss chard, and cucumbers. Beets, carrots and string beans may also be put up in this way, either pickled or in brine. Rutagas, turnips, celeriac, parsnips, as well as carrots and beets, may simply be placed in a cool cellar (the temperature of which should not be kept higher than 40 degrees Fahrenheit), in bins of dry sand, where they will retain their usefulness until the late spring. Cabbages, Chinese cabbage, Brussels sprouts, and kohlrabi may be placed in the cellar with the heads down and covered with sand, taking care that they do not touch each other, but that each is entirely surrounded with a layer of sand. String beans and cabbage may, of course, be preserved by the fermentation method in the form of sauerkraut. Parsley, sage, thyme, marjoram, summer savory, basil, and celery leaves should be dried in a cool room, preferably dark with an abundance of circulating air. For this purpose they should be spread on newspapers in thin layers and turned frequently, or they may be tied in small bunches and suspended from a line until thoroughly dry when they should be packed in airtight boxes, such as baking-powder tins, etc. In gathering cabbages and the above herbs, care should be taken that they are free from dew and other moisture, as this would cause moulding and rotting. Okra or gumbo is not much known in the North; however, it makes an excellent and nourishing addition to soups and tomatoes; this can be dried by cutting into quarters lengthwise and subjecting to sunlight or other gentle heat and plenty of air. The same is true of sweet corn, which must be cut from the cob and dried as rapidly as possible. If this corn is soaked for several hours and boiled in milk with a little piece of butter with pepper and salt added, it is quite equal if not superior to canned corn. Parsnips may be left in the ground all winter and used in the early spring before growth commences; they will be found more tender and delicious at this time on account of the freezing they passed through.

All of the vegetables and herbs mentioned are of the easiest culture, requiring only medium quality soils to produce fair crops; they should be kept free from weeds and constantly cultivated, any special fertilization or cultivation will be well repaid, however, by heavier yields and more tender products. Weeds in fence corners and out-of-the-way places should be treated by spraying with sulphate of iron, Atlas A or Eureka weed killer. This should be made a community proposition, as concerted action is needed to insure results. Close attention to the above outline will result in a vastly increased food supply during this coming winter, besides furnishing the table with a number of delightful dishes which have only too often been absent in the American household.

National Congress of Horticulture Effected

By E. R. Lake, Secretary American Pomological Society

AN organization under the above name was effected in Washington City, November 17, 1916. The event was the outcome of a meeting called by the American Pomological Society. During the past four or five years some members of this organization have sought to modify the character of the activities of this old and venerable organization. For the purposes of determining the sentiment of the society upon this point, and of ascertaining the views of the state societies regarding federation and national and interstate problems, the executive committee of the society invited those interested to meet as above.

After an extended discussion of two days, during which Dr. L. H. Bailey made a quiet and telling appeal for the maintenance of a high-class amateur association, the real sentiment of the substantial element of the American Pomological Society membership, it appeared evident that there was a determined desire to organize a strong central body to serve as a clearing house for national, international and interstate problems, legislative and commercial questions; and further, to serve as an active agent in the collection and dissemination of scientific, statistical and economic data in so far as such touch upon the development, promotion and progress of American and foreign horticulture. The temporary organization effected, steps were taken to prepare a program of

work for the next six months, as follows: Constitution and by-laws; articles of incorporation; publicity; soliciting membership from state horticultural societies and other bodies; and establishing an official organ.

The depth of interest with which the movement was received by those participating may be indicated by the alacrity with which seventy-five per cent of them subscribed to charter membership at a fee of five dollars. Those present who were familiar with previous preliminary organizations of such bodies said that nothing like the anxiety to subscribe and pay up was ever seen before—a bright and auspicious omen from their viewpoint. Among the first members enrolled in this comprehensive body are the representatives of the Augusta County Fruit Growers' Association, Virginia; Connecticut Pomological Society; Eastern Fruit Growers; Minnesota Horticultural Society; National Apple Growers; North Carolina Horticultural Society; Northern Nut Growers; Pennsylvania Horticultural Association; South Dakota Horticultural Society; Virginia Horticultural Society; Wisconsin Horticultural Society, and individuals. The presence and activity of the representatives of leading state horticultural societies is evidence that these organizations, which are chiefly pomological, are to be the leading factors in the early promotion of this movement. The preliminary steps are looking to the establishment of an organization of from 50,000 to 60,000 members, ultimately to include every paid-up member of all horticultural organizations in the United States. The active voting membership to consist of delegates appointed by the affiliating bodies on a basis of something like one delegate for each one hundred members.

This scheme in its entirety contemplates a real or actual congress meeting annually and having an active voting membership from five to six hundred, with a corresponding attendance at its sessions, which would be business meetings for the discussions of the big interstate, national and international fruit, flower, vegetable, ornamental, seed and plant problems of these United States. There is no denying that the movement is fraught with tremendous possibilities. How successful the effort will be depends quite largely upon the degree of support given it by the state horticultural societies and associations. If these bodies can see as clearly as the leaders in the movement appear to, where and how an organization like this can aid them there should be no question that 1918 will see a very active and promising Congress of Horticulture. A synopsis of the preamble, tentative program, objects and organization of the Congress will be submitted to the state horticultural societies at their forthcoming meetings.

The spirited declaiming of Lupton, the insistent action of Crandfield, the placid but forceful assertions of

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Latham, the disquieting meaty questions of Massey, the fitful discourses of Hutt, the stories of Littlepage, the fiery accusations of McCue and the "acquiescence" of McComb, were fruitful features of the occasion, while a box of "Red-Skin" Jonathans did royal service as a peace factor. If further information relative to this movement is desired, it may be obtained by addressing the Secretary, National Congress of Horticulture, Washington, D. C.

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Fruit is Food.—A great many fruit-growers became seriously alarmed,—and perhaps there was a reason for being so,—over the possibility of fruit being classed as a luxury on account of the serious food condition existing due to the world-wide war. However, a great many, although they did not feel perfectly easy, felt quite certain that the government would not declare fruit a luxury. To do so would have created disaster in the fruit sections throughout the Northwest and Pacific Coast, many of which are dependent on the fruit industry alone. Undoubtedly in many other sections of the United States where fruit is grown extensively, although it may not be exclusive, fruitgrowers and farmers might not be able to continue. However, the government has shown its usual good judgment in the present crisis and has declared fruit a food, acting wisely in so doing for many reasons—because fruit is a necessary part of a balanced ration, a ration that everyone is accustomed to and cannot very well do without. This is especially true with all people who work in offices or whose work is not real physical labor; and it may be said in addition that many thousands of people who are dependent entirely on the fruit industry would have faced ruin if fruit had been declared a luxury and an embargo placed on the railways from handling it.

Evaporating and Drying Fruits.—So many millions of people are engaged in war in Europe that millions of men have been withdrawn from the ordinary fields of productivity. Europe has always consumed immense quantities of dried and evaporated fruits from America, and the need will be greater this year than ever before. Europe will be drawing heavily on America for many kinds of dried fruits, conse-

quently by evaporating and drying goodly quantities each grower can help out the food situation. Every fruit-grower should dry and evaporate enough fruits for his own use and in addition as much more as it is possible for him to care for, for the prime reason it will be needed, and for the further reason it will command a good sale at fair prices.

Vegetable Gardens.—While everybody is planting potatoes, fruitgrowers and farmers should not forget there are many other vegetables like carrots, onions, cabbages, etc., that keep well during the winter if properly stored, and if you have not already planted a sufficient diversity you should do so before it is too late, planting so they will mature before winter. Parsnips, a most delicious vegetable, can be left in the ground all winter and dug whenever wanted. Another fact that should be borne in mind in most districts where irrigation water is plentiful, fruitgrowers can continue to make plantings of many kinds of vegetables every two or three weeks, keeping a continuous supply throughout the season.

Fruit for Food.—The fruit industry has certainly been given the recognition due it by the United States government, classifying fruit as a food instead of a luxury. Fruitgrowers should show their appreciation by doing everything in their power to produce as large a crop of fruit this year as possible and to produce as clean a crop as possible, packing it in good standard grades, true to name, so the purchaser and consumer can depend on what he is getting. If the fruit-growers will do their "bit" in their own industry they contribute a large supply of food to the world.

Boxes, Baskets, Crates, etc.—The increasing cost of containers for all kinds of fruits is becoming serious and the fruitgrowers who postpone purchasing until too in the season may be unable to get a sufficient quantity. On the other hand, prices may advance very materially. One thing is quite sure, prices will probably not decrease below the present figures; therefore it seems good judgment for the fruitgrower to place his orders for what containers he will need during the season, hauling them to his packing house as early as possible.

Canning Fruits and Vegetables.—The government realizing, because it has information more fully than the public in general, the food condition, not only of the United States but of the world, is doing everything possible in the way of stimulating, preparing and encouraging people to increase production and warning them against waste. The government realizes that canned fruits and vegetables are a great source of food during the winter months, so the editor of "Better Fruit" earnestly urges every fruitgrower to put up a good supply of

canned foods, enough for your own use, and if you are prepared and equipped to do more, do so by all means, as there is no question but what all you will put up will be needed, and you will find a ready sale at good prices.

Tractors.—Every day the tractor is becoming more popular on account of its efficiency and economy. The increasing prices of hay and feed has been a big factor in directing attention to the tractor, and as a result more tractors have been sold, and farmers are rapidly finding out they do the work at a great deal less cost and a great deal quicker. So great is the demand for tractors and the use of tractors at the present time that many have equipped their tractors with ample lights so that cultivating can be done at night time, thus enabling one tractor to do double the amount of work.

The Liberty Loan.—By the time the June edition will have reached our subscribers the date for registration, June 5th, will have passed and 500,000 will be accepted. However, many will register who will not be called on at the first call. All these and many others not within the age limit, or those who do not go on account of physical reasons, and various other reasons, can do their share and help the government in the present crisis by subscribing to the Liberty Loan, as the bonds are arranged in very small amounts on very easy terms, making a satisfactory investment. Everyone should do his "bit" for his country at the time when it is needed.

Bees.—The increased price of sugar makes the bee an important insect at this particular time. Sugar is a necessity for a balanced food ration. The price of sugar is very high and fruit-growers, by maintaining a few hives of bees at no cost, can put up a lot of honey for winter use, which will provide the necessary sugar and save considerable money, as sugar is already high and probably will be higher. In addition to this by maintaining a few hives of bees, supplying sugar for your own family, and possibly some to sell, you won't be drawing from the already limited supply on hand, which others need, who live in the city and cannot keep bees.

Attention, Fruit and Vegetable Growers

CAN your Fruits, Vegetables, Meats and Fish in Sanitary Cans, with the H. & A. Steam Pressure Canning Outfits, built in Family, Orchard and Commercial size; seal the cans with the H. & A. Hand or Belt Power Double Seamer; they will save your perishable fruits and vegetables at ripening time when nothing else will. Write for descriptive matter.

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Station A

Portland, Oregon



The Rhizoctonia Disease of Tomatoes

[State Agricultural Experiment Station, Pullman, Washington]

THE disease of tomatoes known in the Northwest under various names as blight, yellows, yellow blight or western blight, is due to the sterile fungus, Rhizoctonia, which lives upon the roots of the affected plants. According to the Pathologist of the Experiment Station, the symptoms and effects of the disease are as follows:

1. The aerial parts of the plant: Dwarfing or reduction in size of the entire plant; the production of the rosette type of growth; discoloration of the foliage; curling or rolling of the leaflets; reduction in size of the fruit and premature ripening or failure to set any fruit; wilting and death of the entire top.

2. On the roots: A network of brown fungous filaments upon the surface of the roots; the occurrence of black nodules or masses (scleroti) at various points upon the roots; the presence of dead corroded areas (lesions) upon the roots or basal portion of the stem; the death of roots from the tip backward; an abnormal production of adventitious fibrous roots.

The parasite is present only on the

roots or basal portion of the stem and the symptoms shown by the foliage are only an indirect effect of the parasite. The disease may be barely evident or sufficiently severe to kill the affected plants. The same fungus causes the "damping-off" of seedlings.

Control: The habits of the causal fungus must be taken into consideration in methods of control. Rhizoctonia is common in many soils and attacks many wild plants and cultivated crops. It has been noted in Washington during the past two years as the cause of serious disease in potatoes, beans, beets, peas, cucumbers, peppers and strawberries. Infected seed potatoes are undoubtedly responsible for many cases of serious soil infection.

Cultural practices must be resorted to in the control of this disease and the following suggestions are offered for the guidance of growers:

1. Use clean soil free from Rhizoctonia for the growth of tomato plants if they are to be transplanted, or if the soil is infected use some method of sterilization.

2. Avoid ground upon which potatoes have been grown during the past four or five years. Give attention to the possible occurrence of the disease upon some other crop that might have infected the soil. Cereals and other grasses are never attacked by Rhizoctonia.

3. Practice a culture that will supply the growing plants with an abundance of moisture. Lack of moisture in-

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in business who does not back his convictions with his own means has a hard job convincing others to put their money on his judgment.

During the past winter it appeared certain to us that there would be a marked scarcity of raw materials entering into the construction of our

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With sales today double those of last year we have the best of evidence both of the quality of our products, also that dealers and growers see the necessity of prompt action on their part to secure the necessary equipment for the fall crop.

It is but good business judgment on your part to place your orders now. With distributors in every fruit section we can serve you quickly with orchard supplies of sterling quality and reasonable price. Write us today for quotations and distributor's name.

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PORTLAND, OREGON

creases the severity of the disease since the fungus is constantly cutting down the supply of absorbing roots, and so making it more difficult for the plant to obtain sufficient water. Good cultivation for the aeration of the soil is also an important factor.

4. Use a liberal amount of fertilizer (barnyard manure) so as to stimulate the growth of the plants, and if the soil is known to be acid use lime also.

5. In transplanting to the field do not set the plants too shallow. Deep setting gives a greater opportunity for the development of adventitious fibrous roots to take the places of those killed by the fungus. It may even be advisable to set the plants in shallow trenches and gradually fill around them with successive cultivations.

6. Growing the plants in the field to avoid transplanting is sometimes of value. Injury to the root system in transplanting does not allow the entrance of the fungus, but retards the development of the young plant without affecting the advance of the fungus. Carefully transplanted plants that suffer little or no check in their growth are more likely to keep ahead of the fungus.

7. In case a soil infection of a field is suspected, early fall plowing with frequent cultivation is suggested. It seems probable that the aeration of the soil by frequent cultivation lessens the amount of the fungus that will remain alive. Some growers have used this practice with excellent results.

Cherry Gummosis

A question as to the cause, cure and prevention of gummosis in "Möllers Deutsche Gärtner Zeitung" brought forth the following reply from Mr. R. Muller of Gotha, Germany, in its issue of October, 1914. Mr. Muller's studious and practical experience of many years' standing in cherry-tree culture lends peculiar weight to his observations and suggestions. He writes: "After many years of practical experience with the problem of gummosis I am of the firm opinion that gummosis is not an indication of sickness of single parts of the tree. Even if wounds, bruises and frost injuries may be considered accountable factors, still, I believe, the

causes must mainly be sought for in disturbances of the nourishment of the tree, just how is still not clear to us. They are, perhaps, mainly to be traced to the condition of the soil. In my work for over thirty years as manager of a tree nursery I have from the beginning accepted a surplus flow of sap as the prime cause of gummosis, and this the more as always the thickest and strongest limbs suffered peculiarly from it. As the soil condition of the nurseries varied much it was not possible always to locate our cherry quarters on identical land. However, we always chose such locations as had received no stable manure for a period of at least two years, but which had previous to being planted with seed-

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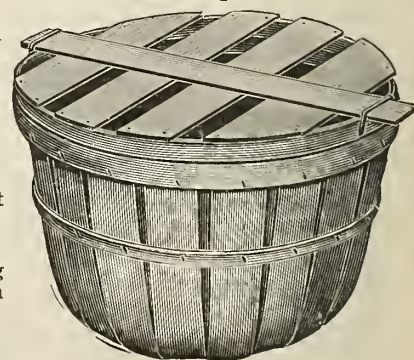
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SIMPLICITY, ECONOMY AND EFFICIENCY
ABSOLUTELY NO BRUISING

Two men, one an **experienced machinist**, the other an **experienced cabinet maker**, with many years' practical experience in the fruit industry in Hood River, combined their **mechanical skill** and practical knowledge of fruit handling in perfecting a **grading machine**—a **model of simplicity, economy and efficiency**.

There is no machinery—Nothing to get out of order or be fixed connected with the Ideal Fruit Grader. It is practically all wood.

The operation is simple, consisting of a belt for a conveyor, operated by electricity or gasoline engine, and short elastic belts, which move each apple in the proper bin from the belt conveyor.

The Ideal Fruit Grader divides the crop into Extra Fancy, Fancy and C-grade, all at one time. The Extra Fancy being divided into seven bins on one side, the Fancy into seven bins on the other side and the C-grade going into six bins at the end of the grader.

Built for four sorters, the grader is 28 feet long and 10 feet wide; built for eight sorters, 32 feet long.

In 1916 we packed 9,000 boxes with the Ideal Fruit Grader with two packers without the machine ever stopping once for repairs of any kind. Further detailed information, illustrated circulars and prices will be furnished upon request.

IDEAL FRUIT NURSERY CO.
HOOD RIVER, OREGON

lings, been richly supplied with compost dirt, to be plowed under. Where a sugar refinery is handy I would recommend the use of lime which when worked into the compost heaps gives excellent results, particularly so on heavy clay soils. I consider the direct application of lime dangerous, as one place might easily get too much and injure the roots. Cold, non-porous, or even wet land is unsuitable for cherry culture. By my selection of seedlings I look less to size of trunk than to strength of root system.

When the cherry trees are young I have had success in healing by tapping or bleeding. To cut out the places of flow, to paint them with grafting wax, or to bandage them tightly, I regard as purposeless. Gummosis will always find new outlets. In bleeding, however, I consider a frequent softening up and washing off of the protruding sap beneficial as it furthers the healing of the wound. Sour cherries that have been grafted on sour-cherry stock are less subject to an attack of gummosis both as small nursery trees and also later as bearing trees. Older sweet cherry trees are seldom entirely free from gummosis, but may nevertheless live for many years and bear abundant fruit. This has been my experience at Praust. Here I found a fine cherry orchard about thirty years old which, despite a favorable location and good soil conditions, numbered many trees that were suffering from gummosis, so much so that the gum flow was gathered and used in place of dextrin as paste

for envelopes, etc. Now after nearly thirty years many, of course, have succumbed, but up to a few years ago when I retired many were still bearing satisfactorily. One row of trees on ridge covered with sod and planted in marly clay soil was practically free from the disease. I may add that in the places where old trees had died no young tree, however healthy when planted and despite a change of soil, would ever thrive. In their place we planted seed-fruit trees."

Only Tree-Ripened Fruit is Perfect

There is but one really great chemist, Nature. Man knows a lot about chemistry, more and more every year, and he is learning that only ripe fruit is of the highest quality. The easy plan of picking apples, bananas and oranges when the fruit is half ripe and allowing it to become fit for use while in transit from the tree to the table has been abandoned or should be abandoned in every well regulated producing district. Only fruit ripened on the tree can be of highest quality on the table.

Apple growers in the Hood River district of Oregon have learned the lesson in chemistry, the lesson which means so much to the consumer of fruit. To get the bright coloring of the Hood River apple the fruit must remain on the tree until it is fully ripe. To gain the delicate flavor and the proper amount of sugar the fruit must remain

in the sunshine to the last minute, must be allowed to take from the tree the last bit of nourishment and from the air the nectar which the bee takes from the flower. The combination of fresh air, sunshine, iron in the soil, mountain breezes, perfect pruning and thinning,

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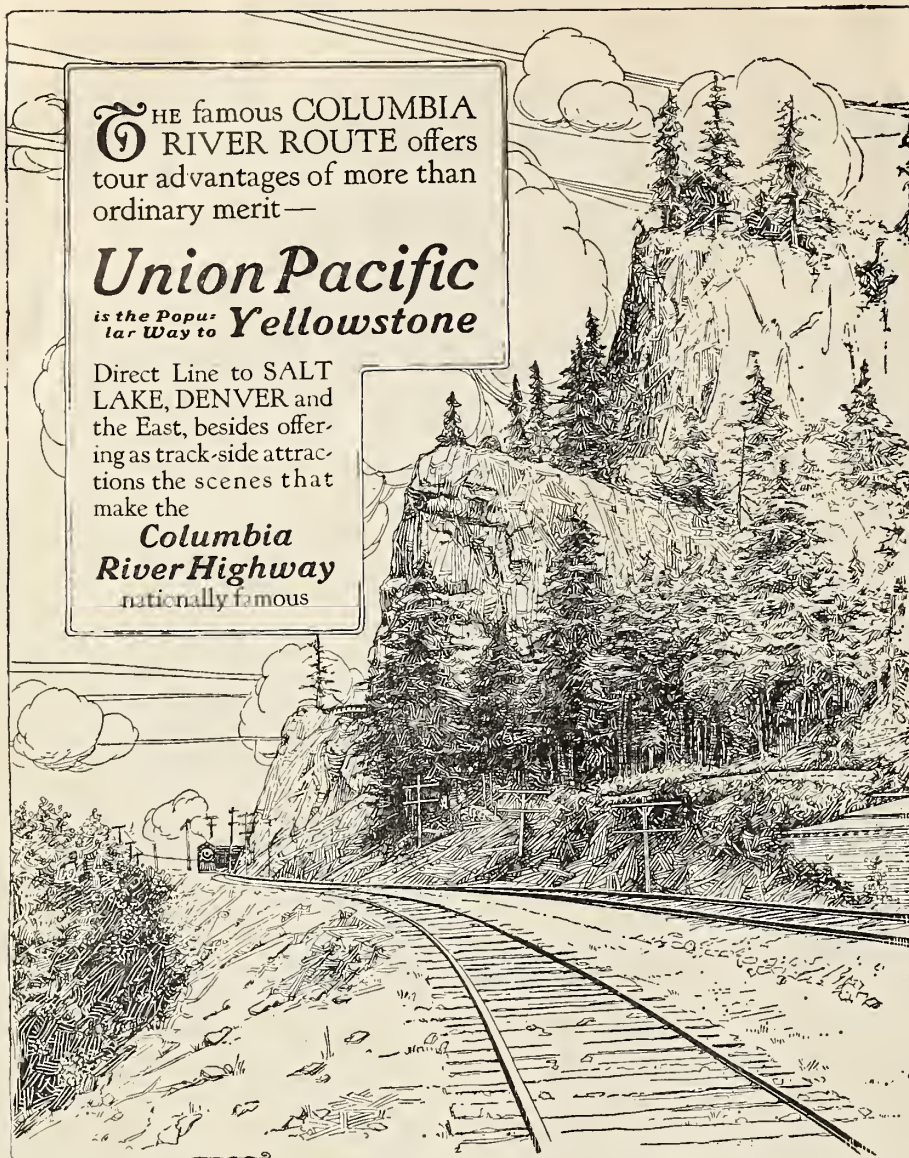
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1917 Tourist and National Park Season begins June 20th.

Sale dates June 20-30, July 3, 4, and Fridays and Saturdays thereafter up to September 29. Return limited to 3 months, but not later than October 31, 1917. Denver, \$62.50; Omaha, \$67.50; Chicago, \$80; New York, \$118.20; Washington, \$116. Fares to other cities, special dates, reservations, tickets and information upon application to

City Ticket Office, Washington at Third Street, or to Wm. McMurray, General Passenger Agent, Portland

gives to Hood River apples the most exquisite colorings, the most delicate flavors and the most uniform size.

Housewives are fast learning that only apples allowed to ripen on the tree, in the autumn sunshine, will give the delicate dishes desired, and they are more and more demanding the boxed and graded article, under guarantee of the Hood River grower, who is

bending every effort to produce the finest apples offered on the markets of any country.

Raw Vegetables Healthful

The various fresh vegetables which may be eaten raw or served as salads are always welcome in season. It is, however, difficult to classify plants according to their uses, because so many are served either raw or cooked. Generally speaking, salad plants may be classified as those whose leaves and stems are usually eaten raw with a sour dressing, and a salad is a dish consisting wholly or in part of raw or cooked vegetables served with a sour dressing which contains fat in some form. Raw green foods are valuable because they

are attractive in appearance and stimulate an appetite for the more substantial foods, and also because in this shape we retain all their mineral constituents which are liable to be partly lost in cooking. The vegetables most commonly used uncooked for salads are as follows: Lettuce, cabbage, celery, water cress, onions, cucumbers, radishes, carrots, kohlrabi, endive, chicory, sorrel, pepper grass and nasturtium seeds.

Delicious salads may be prepared from portions of vegetables that are frequently wasted in cooking. If the outer leaves of cabbage are used in a salad bowl, any adhering may be washed off and the leaves used in a scalloped dish or soup. The coarser stalks, white leaves and roots of celery should be used in soup stock, or the leaves may be dried and used for flavoring when celery is out of season. Green onion tops are good for flavoring soups, or may be cut into inch lengths, cooked and served with toast. These vegetables must always be thoroughly washed. The practice of cutting across the head of lettuce or celery should be discouraged, because it is practically impossible to cleanse the axis of the lower leaves. All such plants should be separated in their natural divisions and carefully washed through several waters. In preparing more than one head of lettuce at a time, sort out the coarser portions to be used in soup or greens. The next best parts may not be attractive enough to serve plain and should be shredded for combination with other material, while the heart of the lettuce may be served in the simplest way. Part of the lettuce may be put in a tin pail with a tight cover, or be wrapped in a piece of cloth, or be put in a paper bag, and will keep crisp until the next day. Greens should be cooked in salted boiling water ten minutes. Blanch in cold water two minutes, drain, chop lightly, and heat in stewpan with butter, salt and pepper. Serve with lemon juice or vinegar.—Sarah L. Lewis, Assistant Professor of Domestic Science, Oregon Agricultural College.

ORCHARD YARN

Listen, Orchardists: Now is the time to tie your fruit trees. All limbs can be readily seen; the spurs are less easily broken off than later; the saving of time is considerable and yarn is probably as cheap as it will be this season. **Orchard Yarn** is the correct method of supporting trees and the saving of a few trees is worth the cost of the yarn for an entire orchard.

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Nice Bright Western Pine FRUIT BOXES AND CRATES

Good standard grades. Well made. Quick shipments.
Carloads or less. Get our prices.

Western Pine Box Sales Co.
SPOKANE, WASH.

Manufacture of Fruit Products

Continued from page 7.

the fruit business done there is carried on by Oregon packers. During the past year the loganberry-juice industry has made big strides and there are now thirteen loganberry - juice factories, which manufactured about 500,000 gallons of juice and paid the growers about \$200,000. Total capital invested in plants, machinery and equipment approximately \$250,000. The total crop of loganberries in the state this year was approximately 5000 tons fresh berries, about seventy per cent of which was made into juice. There is at least one unfermented apple-juice factory in the state which put up quite a large quantity of unfermented apple juice. I understand their Olympia, Washington, plant used five or six thousand tons of cull apples this season. There are at least ten vinegar plants in the state, although there may be a few more with which I am not acquainted. I am not familiar with the details of this business, so cannot give any information as to output, money distributed or capital invested.

"Use Your Tractor"

"Help your neighbors" is the keynote of a special appeal to tractor owners issued today by Assistant Secretary of Agriculture Carl Vrooman. "Every farmer who owns a tractor," he says, "owes it to his country this spring to do all the custom or exchange work he can do without neglecting his own work. Every hour that his tractor would otherwise be idle it ought to be at work helping a neighbor who is behindhand with his plowing or harrowing. Make your outfit work from dawn to dark; make it work all night if you have enough operators to fill the shifts. The acreage to be harvested this fall hangs on the plow. Don't let an acre that might otherwise be planted go untilled because your tractor is in the shed. Help your neighbors and thus do your part in strengthening the allied lines on the battle fronts of Europe."

Cutting Out Borers Frees Peach Trees

Peach tree borers, the most destructive insects in peach orchards of Eastern United States, are best controlled by worming, or cutting the grubs out of their burrows with a sharp knife in late fall and early spring. Entomologists at the Ohio Experiment Station say that nearly all sprays and washes, as well as all mechanical protectors and barriers, are of doubtful value, some not paying for the cost of their application and others being positively injurious. During the winter the insect lives as a larva in a deep burrow under the bark of the peach tree a few inches below the soil level. With the warm days of early spring it feeds upon the tender growing tissues beneath the bark, causing the tree to become sickly and unproductive and often to die if a sufficient number of borers infest it. By early summer they construct cocoons, and in about nineteen days emerge as adult moths. These parents are clear winged and resemble certain

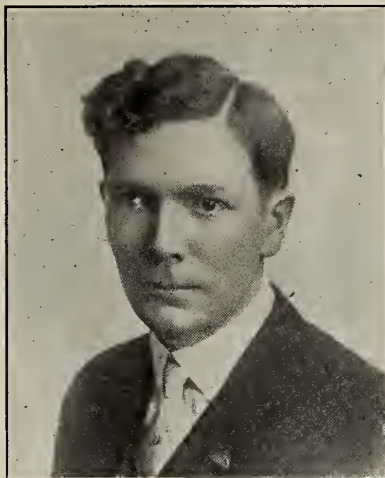
blue wasps. Although the female lives only four or five days, she lays about 400 fertile eggs in this time, and from these the larvae hatch in eight to ten days, or about July 1 to August 30. To kill the borers, remove the soil, when not frozen, from about the base of the trees. Exuding gum and "sawdust" will show the location of the larvae and thus they can be cut out with a sharp knife or probed with a wire. The earth should then be replaced around the tree and left until the middle of September, so that eggs will

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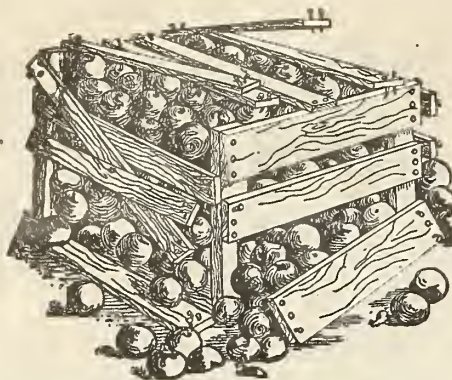
California Spray Chemical Company

768 Woolworth Bldg., New York

Watsonville, California

934 Henry Building, Seattle, Washington

not be laid again in the formerly infested portion. A spray of one gallon of commercial lime-sulphur to eight gallons of water, with a pound of arsenate of lead paste and a little lime added, has reduced the number of borers when carefully applied in early June to the tree trunks and large branches, again in mid-July and later in early August. However, like other sprays, it has not been a complete remedy in experimental spraying tests against this peach enemy.—Ohio Agricultural Experiment Station Bulletin.



BEFORE using Cement Coated Nails

Western Cement Coated Nails for Western Growers

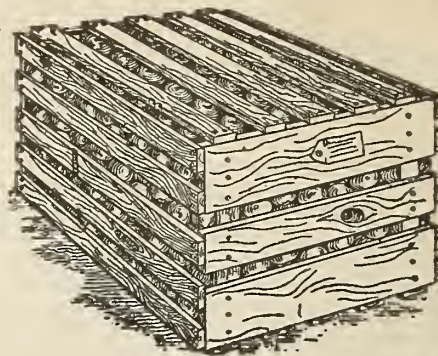
Our Cement Coated Nails are always of uniform length, gauge, head and count. Especially adapted to the manufacture of fruit boxes and crates. In brief, they are the Best on the Market.

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Spray to Save the Fruit Crop from Insects and Diseases

MAXIMUM PRODUCTION OF PARAMOUNT IMPORTANCE

Specialists Advise Methods for Control of Moth, Caterpillars, Aphids, Scale, Curculio, Scab, Blotch and Rot—Treatment for Apple, Peach, Plum and Cherry—Spraying Schedules

By A. L. Quaintance, Bureau of Entomology, and John W. Roberts, Bureau of Plant Industry, U. S. Department of Agriculture

[Editor's Note.—The following article contains information pertaining to fruit diseases and pests and control, and will therefore prove interesting. However, some of the periods for treatment of the various diseases and pests have passed, but the bulk of the spraying is yet to be done during the balance of the year. It should be borne in mind, however, that the remedies and treatments are general, and therefore might not meet the requirements of some districts. The conditions in the Northwest are somewhat different from what they are throughout the East, so it seems wise to suggest to the growers that they do not deviate from their rule, which has proved successful in the past. It is also wise to suggest that where there is a difference or when the fruit grower is in doubt it would be wise to consult the State Experiment Station, the local horticulturist, the county inspector or some other well posted man in whom you have the fullest confidence. Attention is also called to the fact that in the East the delayed dormant spray for fungus has not generally been used, and it may be possible that it is not necessary, although it is generally considered in the Northwest in districts affected with fungus that the delayed dormant is a very important and necessary spray.]

FRUIT, either in fresh, dried, canned, preserved or jellied form is a food product of recognized value. The maximum production of good fruit at this time is, therefore, of paramount importance. Directly concerned in the production of such fruit are spraying operations for the control of various insects and diseases. Owners of commercial orchards have long recognized the importance of spraying, but there are many small orchards and so-called home orchards, the owners of which have not adopted spraying operations, or do not give sufficient attention to the work. The uncared-for condition of such orchards is too often revealed by the great number of wind-fall fruits and the inferiority of that which remains on the trees, the U. S. Department of Agriculture finds. No single feature of orchard practice yields so high a percentage of benefit as spraying, often increasing the value of the product several hundred per cent. Every fruit grower, large or small, has it within his power to save his fruit from loss by insect and fun-

gous pests, and thus add materially to the food supply of the nation. Spraying is now recognized by progressive growers as an exceedingly cheap form of insurance, not only protecting the fruit during the growing season, but insuring its proper keeping in storage.

SPRAYING THE APPLE

The apple is grown over a very large territory and is our most important and valuable fruit crop, and when properly sprayed and handled will keep in storage for months.

INSECT PESTS

The Codling Moth: The codling moth is the dirty white or pinkish caterpillar which feeds within the fruit, mostly around the core, resulting

in a large number of windfalls during the summer and in wormy fruit at harvest time. In the absence of treatments this insect will destroy each year a large proportion of the crop. Fortunately it yields readily to treatments, and a high percentage of benefit follows through spraying operations against it, as outlined in the apple-spraying schedule below.

The Plum Curculio: This little snout beetle attacks various fruits, as the apple, peach, plum, cherry, etc. Early in the spring the beetles puncture the little apples for feeding and egg-laying purposes, causing much of the fruit to fall, and the fruit which remains on the trees becomes knotty and misshapen as it grows. The curculio is notably worse in neglected orchards, as in

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IS an EFFICIENT and RELIABLE MACHINE which will lower the cost in your Packing House and relieve you from dependence on expert packers.

It has proven a good investment in scores of up-to-date packing houses during the past five years.

Order early if early delivery is desired.

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Cutler Fruit Grader Company

HOOD RIVER, OREGON

orchards which are in sod and more or less grown up in weeds and trash. In order to effect a satisfactory control of the curculio by sprays, these unthrifty orchard conditions must be corrected.

The Apple Maggot: This insect, often known as the "railroad worm," railroads or mines the pulp of the apple, making brownish patches or trails. Several maggots in the fruit will reduce the pulp to a filthy mass, merely held together by the skin. Its injuries are confined largely to the Northeastern States. Present evidence indicates that the apple maggot may be controlled by the application of arsenical sprays to the fruit and foliage during early July, and some observers hold that routine orchard spraying is effective in obviating important injury. Drop wormy fruit should be promptly collected and destroyed.

Apple Aphids: Principally three species of aphids attack the fruit and foliage of the apple, namely, the rosy aphid, the green apple aphid and the oat aphid. The rosy aphid is especially injurious to the blossom clusters and causes the fruit to become knotty and distorted or to fail to properly thin out in the clusters, resulting in undersized fruit. The oat aphid is of relatively little importance, though the green apple aphid may seriously check the growth of young trees during the summer when abundant on the shoots and foliage. These aphids winter on the apple trees in the egg condition, the young hatching as the buds are breaking in the spring. They are best controlled by the use of 40 per cent nicotine sulphate used at the rate of three-quarter pint to one hundred gallons of spray. If the treatment for the San Jose scale be delayed, the nicotine may be added to the strong lime-sulphur wash, effecting combination treatment for these two pests. The nicotine may also be added to advantage to the first scab treatment of the spray schedule.

Leaf-Eating Caterpillars: Various leaf-eating caterpillars, as canker worms, tent caterpillars and the like, are more or less abundant in orchards each year in different parts of the country. These caterpillars, as a rule, are kept well in check by the use of arsenical sprays.

Scale Insects: The San Jose, oyster-shell and scurfy scales are very generally present in apple orchards throughout the country. The San Jose scale is by all odds the most injurious and in the absence of annual treatments will destroy or greatly injure the trees. An individual scale is about the size of a pin head, and has a nipple-like prominence in the center. When abundant the scales literally incrust the limbs and branches, to which they give an

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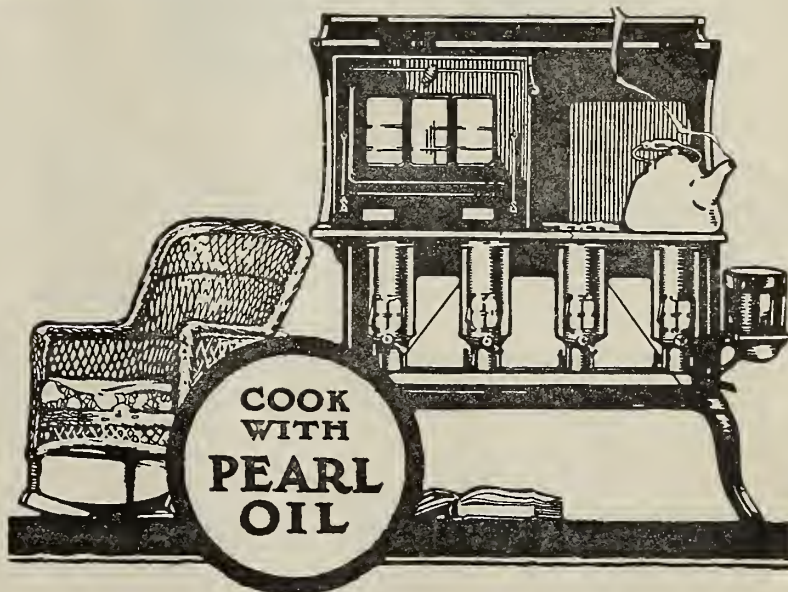
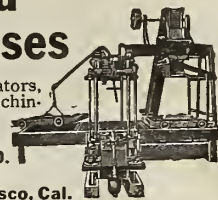
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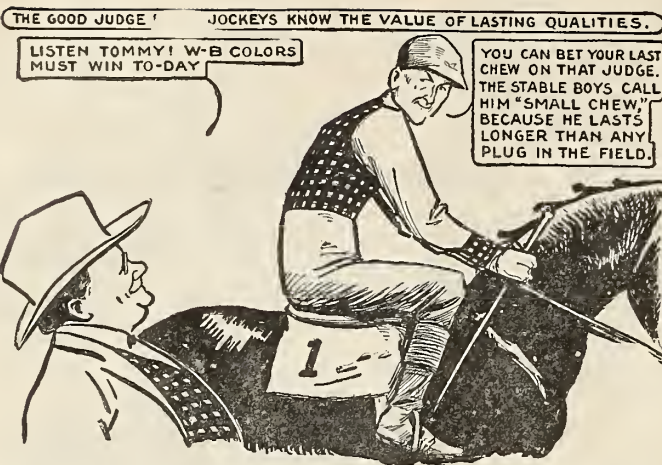
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ash-gray appearance. Badly-infested bark when cut into usually shows a reddish color. These scale pests are very successfully controlled by the use of strong sprays applied during the dormant period of the trees, as indicated in the schedule of applications.

DISEASES OF THE APPLE

Apple Scab: This is the most destructive disease of the apple and is almost universally distributed. It appears very early in the season and causes not only grayish or brownish unsightly spots on the fruit, but often causes cracking and dwarfing of the fruit. It also appears as black blotches on the leaves. It is a cool-climate disease and hence is most destructive in the more northern apple-growing regions. It is well controlled by spraying according to the methods outlined hereafter.

Bitter-Rot: Bitter-rot is typically a Southern apple disease, and in the regions in which it occurs it is one of the most dreaded. It does not appear until the weather has become hot, this date being usually about the first of July, and is one of the hardest of all diseases to control. The rotted spots, with the pink or dark-colored concentric circles of fruiting postules, are typical of this disease. The removal of limb-cankers and mummified fruits in which it lives over from season to season is an important aid to control by spraying. In the East Yellow Newtown (Albamarle Pippin) is especially susceptible to this disease. In the Middle West nearly all varieties are susceptible to some extent at least.

Apple Blotch: This disease begins in the early part of the growing season, but is not conspicuous until nearly mid-summer. It is distributed over the southern half of the apple belt and is to the South what the apple-scab is to the North. It is most destructive in Kansas, Arkansas, Missouri, Kentucky and Southern Illinois. It occurs on fruit, leaves and twigs, but is most destructive to the fruit. It appears on the fruit as an irregular brown spot with a hard roughened surface and a somewhat uneven margin. It grows very slow and finally becomes somewhat sunken. In severe cases, especially on certain varieties, the fruit may finally become badly cracked. Ben Davis, Missouri Pippin and Northwestern Greening are especially susceptible to this disease.

Sooty Fungus and Flyspeck: Toward the end of the summer apples may become covered with large sooty blotches or areas of minute black spots. These diseases do not penetrate the apple skin at all, but injure the market value of the fruit by detracting very greatly from its appearance. These diseases are quite common in the moister parts of the United States and in unsprayed orchards often cause considerable financial loss. They are, in ordinary seasons, controlled by the sprayings applied for the control of other apple diseases.

Black-Rot or Ring-Rot and Leaf-Spot: These diseases are caused by the same fungus, and are controlled by cutting

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out the branches and twigs, supplemented by the sprayings recommended for the other diseases. The applications recommended for scab-control will control the leaf-spot, and those recommended for bitter-rot will greatly lessen the losses from black-rot.

SPRAY SCHEDULES

Dormant Tree Spraying: During the dormant period of trees sprays may be used much stronger than at other times, and for this reason are especially advisable for the treatment of scale insects, blister mite, etc. Applications may be made after the leaves have fallen in the fall, during warm days in the winter, or in the spring before the new growth begins to appear. Where aphids are troublesome it is often practicable to delay the San Jose scale treatment until just as the buds are breaking, and by adding nicotine to the strong lime-sulphur spray effect a combination treatment for these two insects.

SUMMER SPRAYING

First Application: Use lime-sulphur solution at the rate 1½ gallons to 50 gallons of water plus 2 pounds or arsenate of lead paste (or 1 pound or powdered arsenate of lead) just before the blossoms open. This is for apple scab, the plum curculio, canker-worms, the bud moth, case-bearers and the tent caterpillar. Add one-half pint 40 per cent nicotine sulphate if apple red bugs are troublesome, and if apple aphids are much in evidence.

Second Application: Use same spray as in first application as soon as the blossoms have fallen. This is for the above-mentioned troubles as well as for the codling moth and leaf-spot. It is the most important application for both apple scab and the codling moth. In spraying for the codling moth at this time, the aim is to drive in the calyx end of each little apple a quantity of the poison, and, to accomplish this, painstaking work is necessary. Failure to do thorough spraying at this time for the codling moth cannot be remedied by subsequent applications.

Third Application: Use the same spray indicated above three to four weeks after the blossoms fall. This is the second treatment for codling moth and leaf-spot, and gives further protection against apple scab and certain insects. In orchards in which blotch has been prevalent this application should be made not less than three weeks after the blossoms have fallen. Where this disease has been severe, bordeaux mixture (3-4-50) should be substituted for the lime-sulphur solution.

Fourth Application: Use bordeaux mixture (3-4-50 formula) and an arsenical eight to nine weeks after the petals fall. This is the first application for the second brood of the codling moth and for bitter-rot. In orchards in which bitter-rot has been a serious disease this application should be advanced about one week.

Fifth Application: Use bordeaux mixture from two to three weeks after the fourth application. This is the second application for bitter-rot, and since it is very little extra expense to

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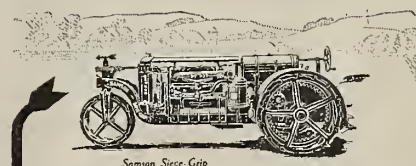
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add an arsenical, this may be profitably done as a further protection against late-appearing larvae of the codling moth.

Sixth Application: Use bordeaux mixture again two or three weeks after the fifth treatment has been applied. This is the third application for bitter-rot and is ordinarily sufficient to carry the fruit through, but on specially susceptible varieties in bitter-rot sections, a treatment to be made two weeks later may be found necessary.

Seventh Application: In severe cases of bitter-rot a seventh application may be necessary, and in severe cases of blotch an extra treatment midway between the third and fourth applications is sometimes necessary.

Note: In the more northern apple-growing sections the first four applications will, during ordinary seasons, be sufficient to protect the fruit from various insects and diseases mentioned. In the more central states, where bitter-rot and blotch are prevalent, the fifth and sixth applications will be necessary. In the case of summer apples, only the first three applications are necessary.

PEACH SPRAYING

There are four or five serious insect and fungous pests of the peach effectively controlled by spraying. Notwithstanding the fact that the larger commercial growers throughout the country have adopted measures for the control of these troubles, there is still room for much improvement on the part of many orchardists, especially those having small home orchards. Although successful spraying of the apple has been practiced for many years, it is only recently that sprays have been developed which are effective and safe for the tender foliage and fruit of the peach and certain other stone fruits. The development of the combination spray of arsenate of lead and the self-boiled lime-sulphur mixture has been of enormous value to peach growers, and its use has placed the cultivation of this crop on a much sounder basis than heretofore.

INSECT PESTS

The Plum Curculio: This insect, already referred to under the head of apple, is the cause of a large amount of injury to the peach. Aside from the injury which it actually does to the fruit, its attack much favors the spread and infection of the fruit by brown-rot fungus. Its control is therefore especially essential in connection with remedial operations against brown-rot.

The San Jose Scale: This insect, also mentioned under apple insects, requires treatment on the peach. Applications should be made while the trees are



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dormant, and if spraying be delayed to just before the buds are due to swell the treatment also controls peach-leaf curl. Winter strength commercial lime-sulphur solution is almost universally used in the case of the peach, since the fruit buds and twigs are more likely to be injured by oil sprays than is true of the pome fruits.

DISEASES

Leaf Curl: This disease affects the leaves of the peach, causing them to become reddened and curled. It begins quite early in the season and is easily controlled by the same treatment which controls scale insects.

Peach Scab: This disease is the ordinary black spot of freckles of the peach. It appears early in the summer and when several spots run together and infections are numerous it gives the fruit a smutty appearance. Severely infected fruits are dwarfed or misshapen, and are often cracked so severely as to cause dropping. This disease causes more loss to growers than is ordinarily realized because infected fruits so often fail to attain their normal size.

Brown-Rot: This is the ordinary rot of the peach which is so often very destructive at ripening time, and is the only peach rot of commercial importance. It is particularly destructive during warm, moist weather. Especially in the South it may sometimes cause the loss of practically the entire crop.

SCHEDULE OF APPLICATIONS

In the eastern half of the United States most of the peach orchards should be given the combined treatment of arsenate of lead and self-boiled lime-sulphur mixture for curculio, scab and brown-rot. The curculio and brown-rot are more especially troublesome in the South, whereas peach scab is worst in the Alleghany Mountain region and in the Northern States.

Midseason Varieties: The Midseason varieties of peaches, such as Reeves, Belle, Early Crawford, Elberta, should be sprayed as follows:

(1) With two pounds of arsenate of lead paste (or one pound of arsenate of lead, powdered) per 50 gallons of water, to which has been added the milk of lime, made from slaking three or four pounds of stone lime, about ten days after the petals fall, or at the time the calyxes are shedding.

(2) With self-boiled lime-sulphur mixture four to five weeks before the fruit is due to ripen.

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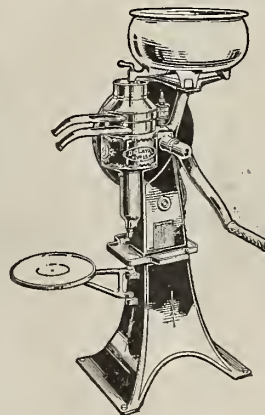
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Late Varieties: The Salway, Heath, Bilyeu and other varieties with a similar ripening period should receive the same treatment prescribed above, with

an additional application of self-boiled lime-sulphur mixture alone to be applied three or four weeks after the second application.

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PLUM AND CHERRY SPRAYING

Japanese plums should receive the same treatment as peaches having the same ripening season. Soap should be added in the third application to enable the spray to stick to the smooth plum fruits.

Cherries should receive the same treatment as early varieties of peaches, except that commercial lime-sulphur

solution, diluted at the rate of one gallon to forty gallons of water, should be used in place of the self-boiled lime-sulphur. Where leaf-spot has been severe this solution should also be used in the fruit treatment. For the control of leaf-spot, an application of the diluted lime-sulphur should also be made as soon as the fruit is picked.

Plums other than the Japanese varieties should receive the treatment outlined in the peach schedule, except that commercial lime-sulphur solution diluted at the rate of one gallon to forty gallons of water is to be preferred to the self-boiled lime-sulphur.

SPRAY MATERIALS

Arsenate of Lead: This arsenical comes on the market in paste and powdered form. In orchard spraying the paste is used at the rate of two pounds and the powdered lead at the rate of one pound to fifty gallons of water or fungicide, as dilute lime-sulphur solution. When used in water without a fungicide, the milk of lime made from slaking two or three pounds of stone lime should always be added for each fifty gallons of spray to obviate danger of burning fruit and foliage. This poison may be obtained of various manufacturers or usually of local seedsmen,

implement dealers or druggists. Care should always be taken in the handling and storage of arsenicals to obviate the danger of poisoning persons or live stock. Where smaller quantities of the arsenicals are desired, the proportions indicated should be followed:

Lime-Sulphur Solution: Strong lime-sulphur solution is used as a dormant tree treatment for the control of scale insects and certain diseases, and in a much more dilute condition as a spray on trees in foliage for the control of various fungous diseases. Many growers prefer to purchase the commercial article, which comes on the market of a specific gravity of about 33 degrees Baume. This is used at the rate of one gallon to seven or eight gallons of water for winter spraying, and at the rate of one and one-half gallons of water for use on apple and other pome fruits as a summer fungicide. In summer spraying the arsenate of lead and 40 per cent nicotine sulphate is added to the dilute lime-sulphur solution, thus permitting the treatment of sucking and biting insects and fungous diseases. Concentrated lime-sulphur solution can be made at home, which practice is followed by numerous growers. Those interested in this matter should write to the Department for more explicit information than is feasible to give here.

Nicotine: Nicotine is used for the control of certain sucking insects as plant lice, the apple red bugs, the pear psylla, etc. This product comes on the market of various grades, but the grade known as 40 per cent nicotine-sulphate is mostly employed. This may be used alone in water to which has been added a little soap, or in lime-sulphur and arsenate of lead, or in bordeaux mixture and arsenate of lead sprays. It is employed at the rate of from three-quarters to one pint per hundred gallons of spray.

Bordeaux Mixture: Bordeaux mixture is composed of four pounds of bluestone (copper sulphate) and four pounds of stone lime to fifty gallons of water. For early summer spraying the amount of bluestone may be reduced to three pounds to lessen risk of injury. To make bordeaux mixture for use in an ordinary barrel sprayer, dissolve three or four pounds of bluestone in 25 gallons of water, and in a separate container slake four pounds of stone lime and dilute to 25 gallons, then pour the solutions simultaneously through a strainer into the spray tank. Stock solutions, especially where large quantities are to be used, are desirable, since they save time. A stock solution of bluestone is made by dissolving it at the rate of one pound to one gallon of water. The bluestone should be suspended in a sack in the upper part of the barrel or other con-

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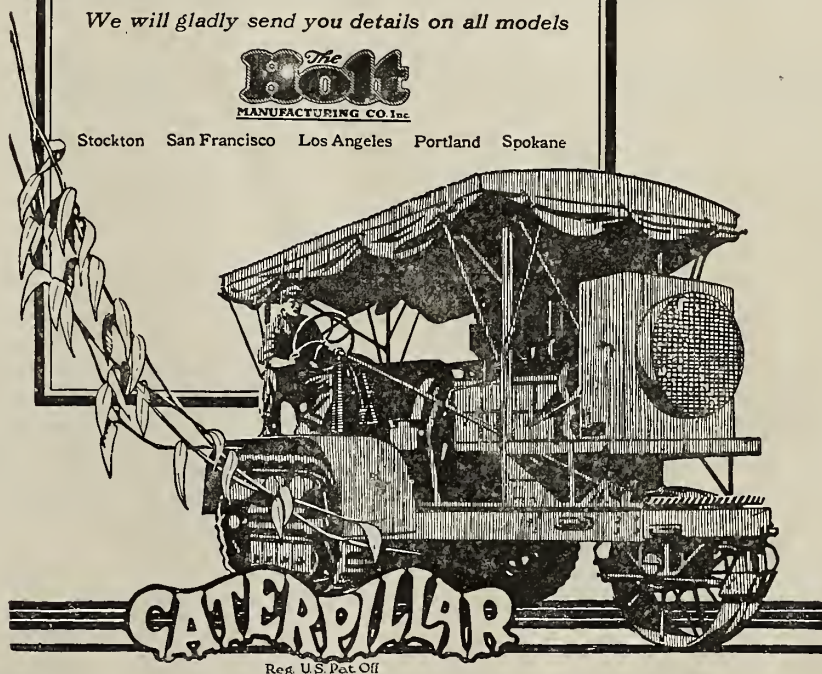
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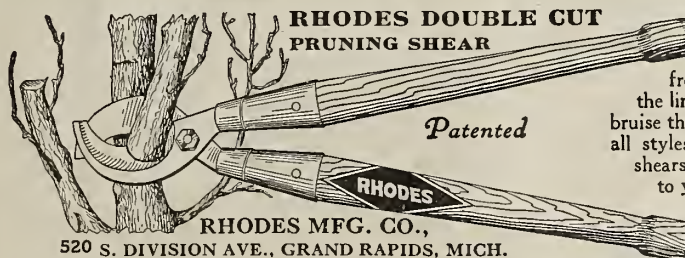


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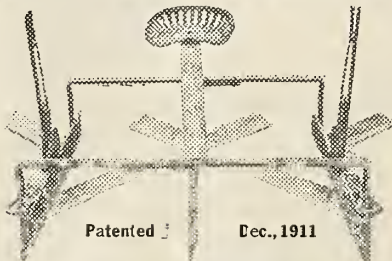
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tainer so that it is just beneath the surface of the water. It will be dissolved if left for a few hours in cold water and more rapidly in hot water. A stock solution of lime may be made by slaking the lime in a little water and then diluting so that each gallon of water contains one pound of lime. Just before the stock solutions are used they should be stirred thoroughly. To make up Bordeaux mixture from stock solutions, it is only necessary for three or four gallons of the stock solution of bluestone to be poured into a suitable container and four gallons of the stock solution of lime into a separate container, diluting each to 25 gallons and then pouring them simultaneously into the spray tank. Commercial Bordeaux may be used in place of the home-made product.

Self-Boiled Lime-Sulphur Mixture: The self-boiled lime-sulphur mixture consists of eight pounds of sulphur and eight pounds of good stone lime to each fifty gallons of water and is made as follows: The lime is placed in a barrel and enough water added to nearly cover it. As soon as the lime begins to slake the sulphur should be added. Water should be added from time to time to form a thoroughly thick paste, which should be constantly stirred. As soon as the lime is entirely slaked, enough water should be added to cool the mixture, which is then ready to be strained into the spray tank, where it should be diluted to the proportions given above. The sulphur used may be in the form of "flowers," "flour" or "commercial ground," and should, if necessary, be run through a screen to break up lumps. Commercial substitutes for the self-boiled lime-sulphur may be used, but should not be confused with commercial lime-sulphur solution.

SPRAYING APPARATUS

For the proper application of sprays some form of spray pump with suitable nozzles is absolutely essential. Most spray outfits are supplied with spray rods permitting the operator to direct the spray as desired. The hose should be of sufficient length to permit convenient spraying.

Spray outfits vary in size from small bucket pumps to gasoline power outfits for large-scale operations. Bucket pumps answer well for small home orchards where but a few trees are to be sprayed. Where the orchard interest is larger, and especially where older trees are to be treated, a barrel pump is essential. A barrel pump may be purchased for twenty to twenty-five dollars, depending on the equipment. In spraying the outfit can be mounted upon a sled or placed in a cart or wagon. An outfit for operations on a still larger scale consists of a 100 or 200-gallon tank mounted upon a truck, having a strong, double-acting hand-pump mounted upon it. For large commercial operations, gasoline power outfits are largely used.

Further information on orchard spraying may be obtained by writing to U. S. Department of Agriculture or to your State Experiment Station.

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